CALIBRATOR FOR LIQUID FLOWMETER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is U.S. National Phase §371 application of International Application No. PCT/CA2005/000365 filed on March 18, 2005, which in turn claims priority from Canadian Patent Application Ser. No. 2,463,477, filed on April 13, 2004, both of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] This invention would be categorized as a liquid measurement device for use in, but not limited to the measuring and calibrating of liquid flowmeters, mostly for petroleum liquids.

BACKGROUND OF THE INVENTION

[0003] In the case of petroleum products sold in the retail sector, the method currently used to calibrate meters is dangerous and outdated. Presently, for each meter, the technician needs to perform the following steps:

1. Place the tank on the ground;
2. Fill the tank with the fuel nozzle of a gas pump;
3. Kneel and take the measurement of the level of the liquid;
4. Write the measurement down;
5. Empty the tank making sure it is truly empty, for the next filling (the technician must not see any drops dripping down for a certain amount of time);
6. Adjust the meter; and
7. Repeat steps 1 through 6 until the calibration is adequate.

[0004] During the whole process, spills, fumes and damage are inevitable and the technician is constantly exposed to fumes. Accidents are frequent.

[0005] To solve this problem, a closed circuit is the most adequate solution. The main inconvenience the need to wait until the last drops have fallen during the emptying of the tank.

[0006] U.S. Patent No. 5,277,053 by Campbell describes a method by which calibration of current systems are done under actual conditions. It includes a first measure at a distance of a first spot, followed by a second measure from a second spot, knowing exactly the move from the first spot, that way the measures are done with a precise knowledge of the shift to get a constant calibration.

SUMMARY OF THE INVENTION

[0007] The calibrator for liquid-flow meters is used to calibrate the liquid-flow meter, mostly petroleum liquids. It makes the operation safe, and it protects the operator, the public and the environment. It may also be used advantageously for the measurement of any liquid with the appropriate viscosity.

[0008] A certain quantity of liquid goes through one tank, the other tanks being an arrangement allowing the acceleration of the calibration of retail petroleum products.

[0009] The calibrator is made of one or several graduated tanks containing 20 liters each, (or other measurement units depending on the country or requirements), mounted on a vehicle.

[0010] The reading of the meter becomes easy, precise and ergonomic.

[0011] The filling fumes are recycled.

[0012] Each of the tanks has a sloped bottom (40 degrees or so), followed by a valve, a transparent dripping reference unit and a second valve attached to a common pipe (sloped) and ending with an ultimate valve. The piping is made of stainless steel.

[0013] The transparent drip reference unit is essential.

[0014] This particular arrangement allows liquid circulation in a closed circuit, eliminating handling spills, loss of liquid, and escaping fumes.

[0015] The invention allows the liquid to return without fumes or turbulence, making the calibration 100% safe. Therefore the present invention helps eliminate fumes, spills and splashes, during both the filling and the emptying of the tanks. The technician will not have to repeatedly pour the liquids from the test-tank to underground tank.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] Figure 1 is a side view of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0017] The calibrator for liquid-flow meter 1 is a machine used to calibrate the petroleum liquid-flow meters. It can also be used for any liquid with the adequate viscosity.

[0018] The machine is made of one or several stainless steel graduated tanks 2 mounted on a level-able vehicle 18. During the filling, the fumes are recycled by way of a hose 3 coming from the top of the necks of the tanks 2 and ending in the ventilation pipe 16 equipped with a removable exhaust valve 17 on top. Each of the tanks 2 has a sloped bottom, at roughly a 40 degree angle, followed by a valve 15, a transparent drip reference unit 5 and another valve 14 leading to a common pipe 19 and an exit valve 13. The piping is made of stainless steel. During the emptying, the fumes are also recycled. The whole emptying process is done in a closed circuit without turbulence and without fumes.

[0019] The transparent dripping reference unit 5 allows us to build a machine that makes calibration work safer.

[0020] How to calibrate with the invention:

The technician:

1. Parks the calibrator near the fuel pump.
2. Use the lever 6 to lift the wheels off the ground.
3. Ground the calibrator to the pump, with the conductor with alligator clip 7.
4. Install the gasoline return hose between the final exit pipe 8 and the gas station's underground tank.
5. Open the exit valve 13
6. Fill the tanks2, one at a time, by inserting the gas pump nozzle in the neck 9 of the tank 2, the neck traps the fumes, the opening lined with a rubber gasket is in contact with the nozzle .
7. Adjust the two levels 10 to both axis with the two handles 11
8. Take the readings while standing up.
9. Note the readings by turning the round pre-marked recall set-up 12
10. Open the valves 13,14, and finally 15, to empty out the tanks.
11. Adjust the meters of the pump if need be.
12. Close the valve 14 as soon as the tanks are empty.

13. Make sure the tanks are truly empty before closing valve 15, by observing the last drops of liquid dripping down, through the transparent drip reference unit 5
14. Proceed with new test as required.

[0021] While the preferred embodiment and various alternative embodiments of the invention have been disclosed and described in detail herein, it may be apparent to those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and scope thereof.

CLAIMS

We Claim:

1. A calibrator for liquid-flow meters comprising:

one or several graduated tanks 2, in stainless steel, mounted on a level-able vehicle 18;

a hose circuit 3 beginning on top of each neck 9 to recycle the fumes during the filling and ending in the ventilation pipe 16 with the removable exhaust pipe 17;

a level indicator 4 to measure the liquid level; and

one or several tanks with a sloped bottom 2, followed by a valve 15, a transparent drip reference unit 5 and another valve 14 leading to a common pipe 19 ending with a last valve 13.

2. A method of calibrating the liquid flow meter of claim 1, comprising the steps of:

a. Park the calibrator near the pump,

b. Use the lever 6 to lift the wheels off the ground,

c. Ground the calibrator to the pump 7,

d. Install the gasoline return hose between piping exit 8 and the gas station's underground tank,

e. Open the escape valve 13,

f. Fill the tanks 2, one at a time , by inserting the gas pump nozzle in the neck 9 of the tank, the neck holds the fumes, it makes contact with the nozzle,

g. Adjust the two levels 10 in both axis with the two levers 11,

h. Take the readings while standing up,

i. Note the readings by turning the round pre-marked recall set-up 12,

j. Open the valves 13,14,15 to empty out tanks,

k. Adjust the meters of the pump if need be.

l. Close the valve 14 as soon as the tanks are empty,

m. Make sure the tanks are truly empty before closing valve 15, by observing the final drops of liquid dripping down through the transparent drip reference unit 5, and

n. Proceed with new test as required.

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ABSTRACT OF THE DISCLOSURE

The inventive device comprises scaled vessels mounted on a vehicle and making it possible, while filling a liquid medium in the vessels, to recycle the vapors thereof through a circuit of casings beginning form he reading sights of the vessels and extending to an air-vent pipe provided wit a removable valve, wherein the bottom of each vessel is embodied such that it is inclined and is followed by a valve, a transparent dripping reference unit and a second valve open into a common tube and ending by an ultimate valve.